

Notice of Allowability

Application No.

09/870,206

Examiner

Todd Ingberg

Applicant(s)

STOODLEY, KEVIN A.

Art Unit

2124

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.


1. ☐ This communication is responsive to 6/17/2002.
2. ☒ The allowed claim(s) is/are 1-15.
3. ☒ The drawings filed on 29 May 2001 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
- * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 5/29/2001
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____


Todd Ingberg
Primary Examiner
Art Unit: 2124

REASONS FOR ALLOWANCE

1. The following is an examiner's statement of reasons for allowance:

Claim 1 specifics emitted compiled code in the runtime environment. Without stating the Just-In-Time (JIT) limitation the runtime environment of claim 1 is interpreted to be the JIT environment. Traditional code emitters in compiler theory (compile and link) do not occur at runtime. The invention claims to solve an unresolved reference problem by a detection mechanism and resolution mechanism. The detection mechanism uses a means of defining a snippet (Specified on page of the Specification 4) with a helper routine (set up for resolution at this point). After a trigger (by code) targets the instructions of unresolved references in the target instructions to pass to the helper routine. The resolution uses the passed data of the helper and associates the target location with the copy of the target instruction. These limitations in combination and taken singularly were not deemed obvious in view of Reissue 36,204 (IDS) as provided in the IDS. Although, Gosling the inventor of JAVA™ teaches resolving data reference in generated code did not disclose the mechanism as claimed in the independent claims.

Furthermore, Chaudhry et al USPN 6,430,649 filed June 7, 1999 teaches a mechanism for reference dependencies by maintaining a "watch address" as oppose to the snippet list invoked with an exception handler.

Independent claims 7, 8, and 11 contain the combination of limitations of independent claim 1.

The limitations of the independent claims are presented below:

Applicant's use of the trademark **JAVA** is noted.

Claim 1

A computer program product comprising a computer usable medium tangibly embodying computer readable program code means comprising a compiler and an associated runtime helper, the runtime helper being defined for resolving references at runtime, the compiler comprising means to emit compiled code including a set of target instructions, each target instruction having an associated target location in the emitted compiled code and having an unresolved reference at compile time, the emitted compiled code for each target instruction comprising:

code means for directing the computer to define a trigger instruction initially located at the associated target location in the emitted compiled code;

code means for directing the computer to define a snippet comprising a copy of the target instruction including the unresolved reference and resolution data useable by the runtime helper to resolve unresolved references in the target instruction; and

the compiler further comprising code means for directing the computer to define the trigger instruction to trigger the execution of defined instructions to pass data to the runtime helper for resolution of the unresolved reference in the copy of the target instruction and to replace the trigger instruction at the associated target location with the copy of the target instruction having the unresolved reference resolved.

Art Unit: 2124

Claim 7

A computer program product comprising a computer usable medium tangibly embodying computer readable program code means for defining a Java runtime environment, said computer readable program code means comprising a Java just in time compiler and an associated runtime helper, the runtime helper being defined for resolving references at runtime, the compiler comprising means to emit compiled code including a set of target instructions, each target instruction having an associated target location in the emitted compiled code, each target instruction including one or more unresolved references at compile time, the means to emit the compiled code comprising:

code means for directing the computer to first emit, for each one of the set of target instructions, an associated unresolved target instruction at the corresponding target location; code means for directing the computer to create and maintain a snippet list comprising entries, each entry in the snippet list corresponding to one of the set of target instructions; code means for directing the computer to subsequently traverse the snippet list to emit compiled code, for each target instruction, comprising: a snippet comprising instructions and data for calling the runtime helper to resolve the unresolved references in the target instruction at runtime, and comprising a copy of the target instruction including the unresolved references, and a call instruction to the snippet, the call instruction being written to the target location in the emitted compiled code, the runtime helper comprising instructions for a specified target instruction to resolve the unresolved references of the specified target instruction at runtime and for the specified target instruction, to replace the associated trigger instruction at a specified target location with the copy of the specified target instruction having the unresolved reference resolved.

Claim 8

A method of generating compiled code for an instruction having an unresolved compile-time reference, comprising the acts of: specifying a runtime helper routine for resolving unresolved references at runtime; emitting unresolved code in the generated compiled code comprising a default reference value being a placeholder for an unresolved reference; emitting a snippet comprising instructions and data to identify the unresolved emitted code in the compiled code and to call and provide data to the runtime helper routine to permit the unresolved reference to be resolved; storing a copy of the emitted unresolved code in the snippet; and replacing the unresolved emitted code in the compiled code with a call instruction for calling the snippet, the runtime helper routine being defined to resolve references at runtime with respect to the copy of the emitted unresolved code in the snippet to define a resolved instruction and to replace the call instruction for calling the snippet with the resolved instruction.

Claim 11

A method for emitting compiled computer code to resolve references in a set of target instructions, each target instruction to be executed at a target location in the compiled code, each target instruction including an unresolved reference at compile time, the method comprising: emitting a trigger instruction for each target instruction, the trigger instruction being located at the target location in the compiled code; and emitting a snippet for each target instruction comprising a copy of the target instruction including the unresolved reference and

Art Unit: 2124

resolution data useable by a runtime helper, each trigger instruction being defined to trigger the execution of defined instructions to pass a specified set of resolution data to the runtime helper for resolution of the unresolved reference in a specified copy of a target instruction and to replace the trigger instruction at the target location with the specified copy of the target instruction having the unresolved reference resolved.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Correspondence Information

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Todd Ingberg** whose telephone number is (703) 305-9775. The examiner can normally be reached during the following hours:

Monday	Tuesday	Wednesday	Thursday	Friday
6:15 – 1:30	6:15- 3:45	6:15 – 4:45	6:15-3:45	6:15-130

This schedule began December 1, 2003 and is subject to change.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Kakali Chaki** can be reached on (703) 305-9662. Please, note that as of August 4, 2003 the **FAX number** changed for the organization where this application or proceeding is assigned is **(703) 872-9306**.

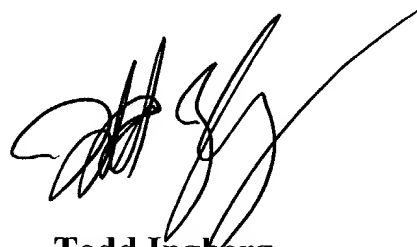
Also, be advised the United States Patent Office **new address** is

Post Office Box 1450

Alexandria, Virginia 22313-1450

Art Unit: 2124

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-9700.

A handwritten signature in black ink, appearing to read 'Todd Ingberg', with a long, sweeping horizontal line extending to the right.

Todd Ingberg
Primary Examiner
Art Unit 2124
May 30, 2004